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VARIOUS TANK ACTIONS REPORT FOR WELL ABANDONMENT AT BUILDING 236 CNC  
CHARLESTON SC  
3/1/2009  
ADVENT ENVIRONMENTAL INC

**VARIOUS TANK ACTIONS  
REPORT FOR WELL ABANDONMENT AT BUILDING 236**

**FORMER CHARLESTON NAVAL COMPLEX  
NORTH CHARLESTON, SOUTH CAROLINA**

**Prepared for:**



**Naval Facilities Engineering Command – Southeast**

**And**



**BRAC Program Management Office – Southeast**

**Contract Number  
N62467-06-D-0125**

**Task Order  
0048**

**ADVENT Project 09-500  
March 2009**

**Various Tank Actions  
Report for Well Abandonment at Building 236**

Former Charleston Naval Complex  
North Charleston, South Carolina

Contract N62467-06-D-0125  
Task Order 0048  
ADVENT Project 09-500  
March 2009

**Points of Contact**

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**Prepared by:**



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## **CERTIFICATION PAGE**

### **REGISTERED SOUTH CAROLINA PROFESSIONAL GEOLOGIST CERTIFICATION**

By affixing my seal to this report, I certify the data and interpretations stated in the *Various Tank Actions, Report for Well Abandonment at Building 236, Former Charleston Naval Complex (CNC)* are true and accurate to the best of my knowledge. I further certify that I am registered to practice geology in the state of South Carolina and that it is within my professional expertise to verify the correctness of this information.

---

James W. Weeg

---

Date

Registration Number: 2494 (South Carolina)

## **LIST OF ACRONYMS AND ABBREVIATIONS**

BDL	Below Detection Level
BRAC	Base Realignment and Closure Commission
CNC	Charleston Naval Complex
CTF	Chicora Tank Farm
IGWA	Initial Groundwater Investigation
MNA	Monitored Natural Attenuation
MSL	Mean Sea Level
NAVFAC	Naval Facilities Engineering Command, Southeast
NFA	No Further Action
RBSL	Risk Based Screening Level
SAS	Surficial Aquifer System
SCDHEC	South Carolina Department of Health and Environmental Control

## **1.0 INTRODUCTION**

ADVENT Environmental, Inc. (ADVENT) was retained by the Naval Facilities Engineering Command – Southeast (NAVFAC) and the Base Realignment and Closure (BRAC) Program Management Office – Southeast to abandon three (3) groundwater monitoring wells located at Building 236 as part of the task order to provide service for Various Tank Actions at the Chicora Tank Farm (CTF), Buildings 236, and 1279, and the Reserve Training Center located at the former Charleston Naval Complex (CNC), in North Charleston, South Carolina. A Work Plan for *Various Tank Actions at the Chicora Tank Farm, Buildings 236, 1279, and the Reserve Training Center* was submitted to the BRAC Office and approved in January 2009. Building 236 is located within the Detyens Shipyard within the Charleston Naval Complex in North Charleston, South Carolina. A site location map is included as Figure 1.

### **1.1 LOCAL SITE DESCRIPTION**

The former CNC is located in North Charleston, South Carolina. Building 236 is a welding and fabrication shop located adjacent to the dry-dock area, that is currently occupied by Detyens Shipyards, Inc.

Local site conditions were assessed by analyzing the topography, geology, hydrogeology, and the overall visual appearance of the property. The following section describes the local site conditions at Bldg 236.

### **1.2 TOPOGRAPHY AND SITE CONDITIONS**

Topographic relief at the Bldg 236 is moderate. Mean elevation at the site is approximately 7 feet above mean sea level (MSL), with a minimum elevation of approximately 5 feet and a maximum elevation of approximately 12 feet.



Building 236 is currently occupied by Detyens Shipyards, Inc. and is operational as the headquarters and as a machine shop for the company. The building is located adjacent to one of the three dry-dock areas available at the shipyard. The site is completely covered by asphalt or concrete and there is no open land.

Building 236 is bordered to the north by a shipyard dry-dock area, to the east by the Cooper River, and to the south and west by other industrial buildings that are part of the shipyard. A site map showing the location of the building as well as the three abandoned wells is included as Figure 2.

### **1.3 GEOLOGY AND HYDROGEOLOGY**

Charleston County, South Carolina, is located within the Coastal Plain Physiographic Province. The Coastal Plain extends along the Atlantic seaboard from Florida to southern New Jersey. The Coastal Plain is characterized by sediments that overlay basement rocks, thickening from just a few feet near the Fall Line to about 3,800 feet at the southernmost corner of South Carolina (Hydrologic Investigations Atlas 730-G).

Charleston County overlies the Surficial Aquifer System (SAS) which extends from Southern Florida to North Carolina. The SAS consists mostly of unconsolidated sand and minor beds of shells and oolitic limestone. At depth these formations are generally confined above and below by impermeable clay layers. SAS sediments range in age from late Miocene to Holocene. The SAS is typically less than 50 feet thick; however the system thickens coastward.

Groundwater flow in the SAS is mostly unconfined. Locally, thin clay beds create semi-confined conditions within the system. Water that enters the SAS moves quickly along short flow paths and discharges as baseflow to streams. Generally, groundwater flows

southeast towards the coast. The transmissivity of the SAS is extremely variable depending on location. Well yields in South Carolina average 50 gallons per minute (Hydrologic Investigations Atlas 730-G).

#### **1.4 HISTORICAL SUMMARY**

The groundwater monitoring wells at Building 236 were installed by ADVENT in November 2004, using a South Carolina Certified Well Driller, as part of an initial groundwater assessment (IGWA) (Figure 2). The wells were developed and initially sampled on November 11, 2004 as part of the IGWA. Additional sampling took place on November 4, 2005 and August 4, 2008 as part of the Monitored Natural Attenuation Program (MNA).

Analytical results from the IGWA detected contaminants of concern (COCs) above the Risk Based Screening Level (RBSL). Sample 236MW001 exceeded the RBSL for naphthalene (25 µg/L) at a concentration of 75 µg/L. During the first round of MNA sampling, concentrations of all parameters were reported below detection level (BDL) or below the RBSL in all monitoring wells except 236MW001. 236MW001 exceeded the RBSL for Naphthalene (210 µg/L). During the second round of MNA sampling, concentrations of all parameters were reported below detection level or below the RBSL in all monitoring wells.

Based on these results, the South Carolina Department of Health and Environmental Control (SCDHEC) issued a letter (SCDHEC Letter dated Sep 30, 2008, Appendix B) designating the site with a No Further Action (NFA) status, therefore permitting the abandonment of the three groundwater monitoring wells.

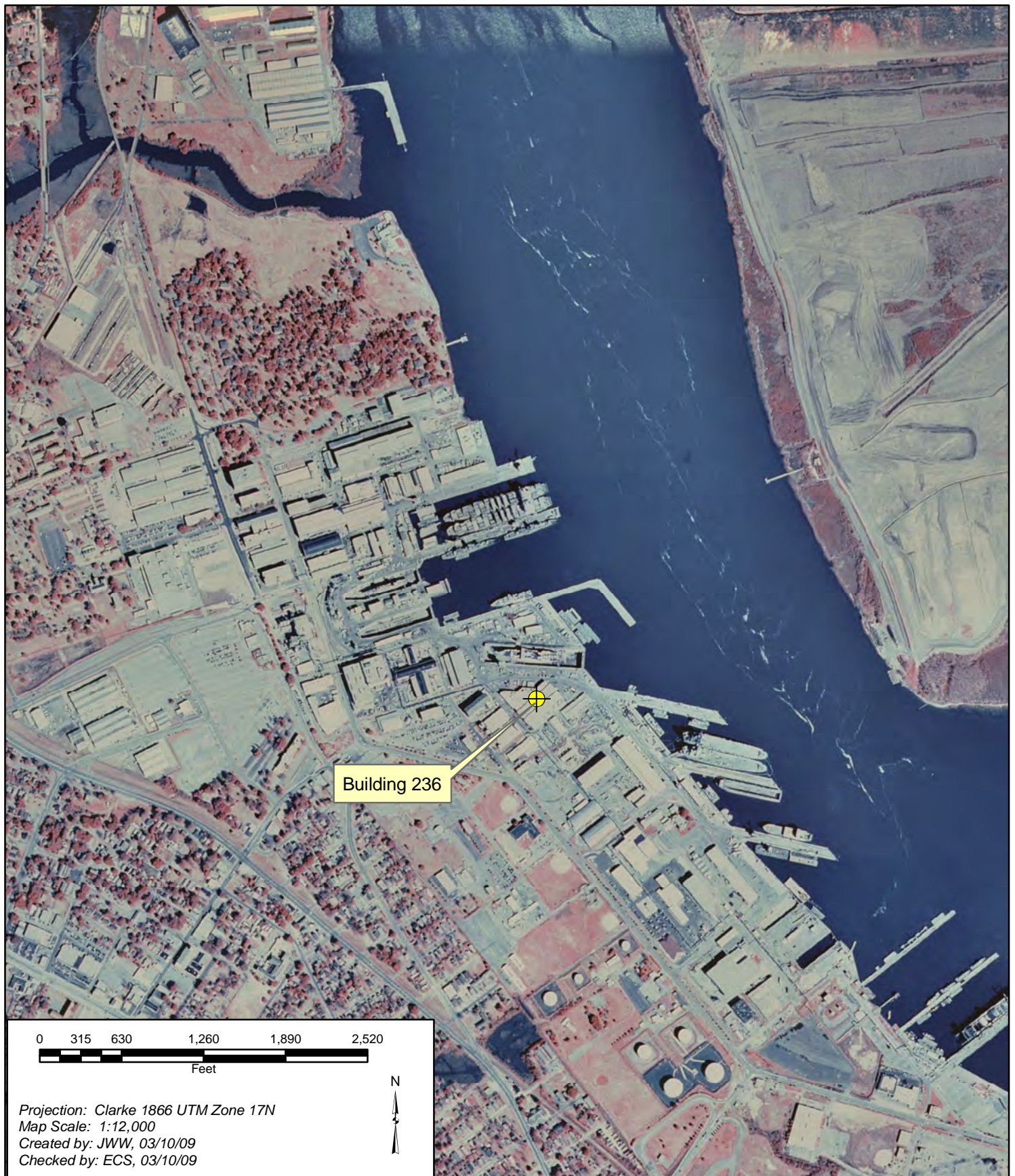
## **2.0 WELL ABANDONMENT**

ADVENT abandoned three groundwater monitoring wells, using a South Carolina certified Well Driller, at Bldg 236, at the former CNC located in North Charleston, South Carolina on February 24, 2009. Abandonment documentation (DHEC Form 1903) for the three groundwater monitoring wells is included in Appendix B.

All three groundwater monitoring wells consisted of flush-mount wells with a metal top casing, set into a 2 foot square concrete pad surrounded by asphalt surfaces. The concrete pads and metal top casing were removed with an electric jack-hammer operated by the well driller. Grouting of the wells was by forced injection of a bentonite/cement through a tremie pipe. The abandonment was carried out as one continuous operation and the wells were filled from the bottom of the well to the ground surface. The asphalt surfaces were patched with commercial asphalt patches. Site photographs are included in Appendix C.

## FIGURES





Prepared for:



Prepared by:



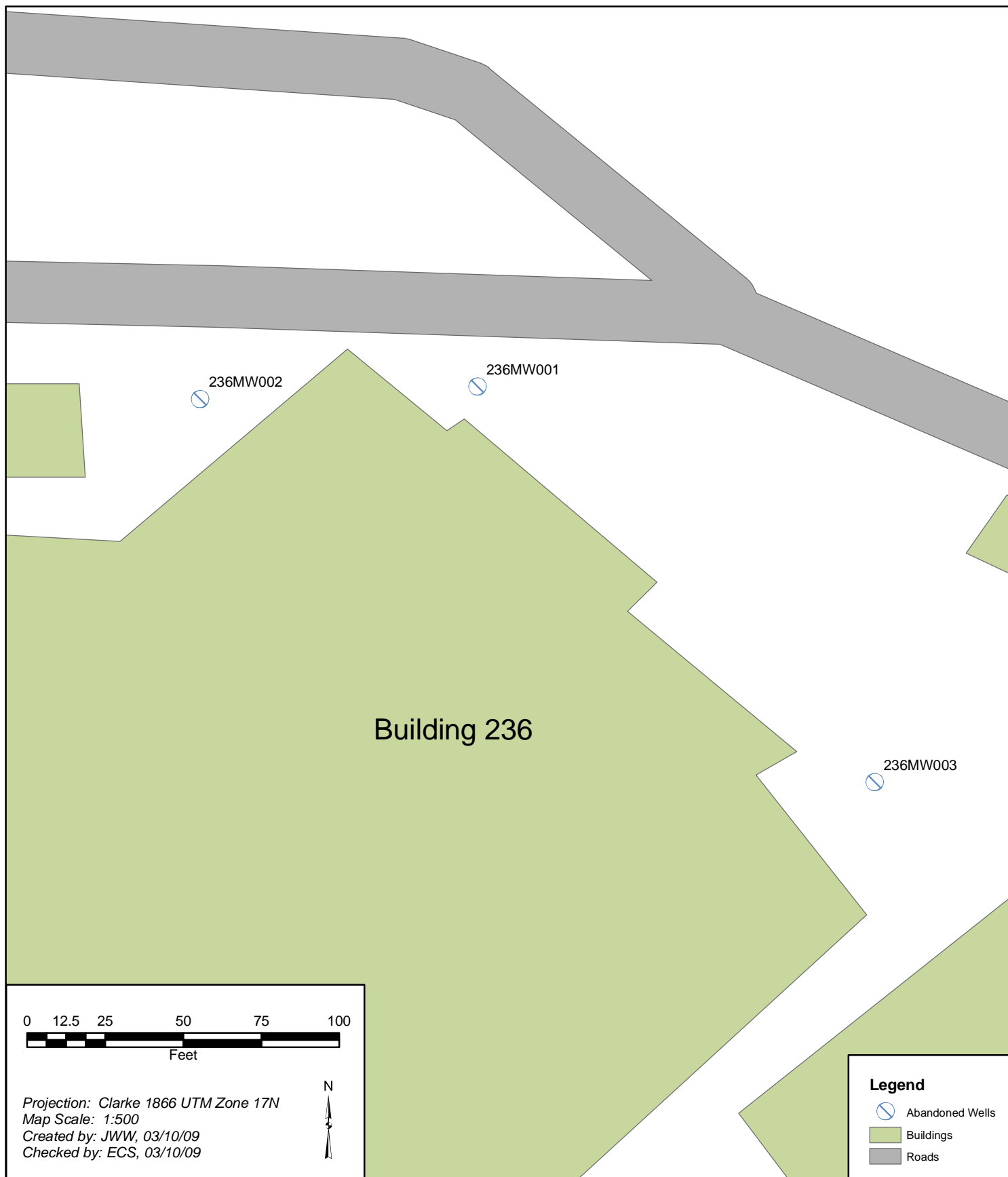
ADVENT Environmental, Inc.  
498 Wando Park Blvd., Ste. 500  
Mt. Pleasant, SC 29464

March 2009

**Figure 1**

**Site Location Map  
Bldg 236, Former CNC  
North Charleston, SC  
ADVENT Project 09-500**

Source: SC GIS Data Clearinghouse



Prepared for:



Prepared by:



ADVENT Environmental, Inc.  
498 Wando Park Blvd., Ste. 500  
Mt. Pleasant, SC 29464

March 2009

**Figure 2**

**Site Map**  
**Bldg 236, Former CNC**  
**North Charleston, SC**  
**ADVENT Project 09-500**

Source: SC GIS Data Clearinghouse

## **APPENDIX A**



Date 2/24/09  
 Location Bldg 236, CHC  
 Tot 0730  
 Weather CLR, 24°F  
 Personnel J.W.

0730 - Onsite, LUL with David Strick  
 and Thomas Smith from  
 Diversified Drilling  
 - Set up at Bldg 236

0800 - Begin work at 236 MW 002  
 - Slurry = Bentonite, poly urea  
 water

0950 - Setup at 236 MW 001

1040 - Set up at 236 MW 003.

1235 - All walls grouted with a  
 trench pipe and pad  
 filled with asphalt patch.

1245 - Enroute to Boes Ferry  
 landfill to dump cement  
 drums.



## **APPENDIX B**



7.1.4

C. Earl Hunter, Commissioner

*Promoting and protecting the health of the public and the environment.*

MS KATHRYN STEWART PE  
BRAC PMO SE  
4130 FABER PLACE DR STE 202  
N CHARLESTON SC 29405

SEP 30 2008

Re: **No Further Action**  
Building 236, Charleston Naval Complex, Charleston, SC  
UST Permit # 16459  
Release Reported January 2, 1996  
Monitoring Report received September 15, 2008  
Charleston County

Dear Ms. Stewart:

The Underground Storage Tank (UST) Program of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the referenced report.

As concentrations of benzene, toluene, ethylbenzene, xylenes, naphthalene, methyl tertiary butyl ether (MtBE), EDB, and PAHs are below established risk-based screening levels, the reported release does not present a significant threat to human health or the environment. Therefore, no further action will be required at this time. However, if any contamination becomes evident which could be attributed to this UST system, this office may, under authority established in the South Carolina UST Control Regulations R.61-92 Part 280.52/280.73, require site rehabilitation activities.

The decision for requiring no further assessment pertains only to the UST release from the former UST reported in January 1996 and is based solely on the information provided in the referenced report.


**The Program intends to report this closure to the United States Environmental Protection Agency. If for any reason you disagree with this decision not to require any further environmental rehabilitation activities, please contact me in writing within thirty (30) days of the date of this letter.**

The monitoring wells at the facility may be permanently abandoned in accordance with the S.C. Well Standards and Regulations, R.61-71 by a certified well driller licensed in South Carolina. Should you choose to abandon the monitoring wells, please submit the well abandonment logs to the Program within 90 days from the date of this letter. If you wish to keep the wells for future monitoring of this release or another release, please notify the UST Program that you wish to keep the wells.

Ms. Stewart  
Page 2

On all correspondence related to this facility, please reference UST Permit #16459. If you have any questions, please don't hesitate to contact me at (803) 896-6676 or [blockse@dhec.sc.gov](mailto:blockse@dhec.sc.gov).

Sincerely,



Susan Block, P.G., Hydrogeologist  
Northeastern SC Corrective Action Section  
Assessment and Corrective Action Division  
Underground Storage Tank Program  
Bureau of Land and Waste Management

cc: Mr. James Weeg, P.G., ADVENT Environmental, Inc., 498 Wando Park Blvd., Ste. 500, Mt. Pleasant, SC 29464  
Technical File



## Water Well Record Bureau of Water

2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

### 1. WELL OWNER INFORMATION:

Name: N.A.V.F.A.C. southern div.  
(last) (first)

Address: 2155 Eagle dr. 29419-9010

City: North Charleston State: SC Zip:

Telephone: Work: (843) 820-7307 Home:

### 2. LOCATION OF WELL: GW-001 COUNTY: Chas.

Name: Charleston Navel Complex Bldg.236

Street Address:

City: North Charleston Zip: 29419-9010

Latitude: 32 57 615" Longitude: 79 57 900"

### 3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

Bldg. 236

cnc236gw001

### 4. ABANDONMENT: ☒ Yes ☐ No

Grouted Depth: from 15.0 ft. to 0.00 ft.

Formation Description

\*Thickness  
of  
Stratum

Depth to  
Bottom of  
Stratum

\* NOTE- CNC236GW001

ABANDONED ON 2/24/09

BENTONITE TREMIE

METHOD.

\*Indicate Water Bearing Zones

(Use a 2nd sheet if needed)

### 5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored  
☐ Dug ☐ Air Rotary ☐ Driven  
☐ Cable tool ☐ Other

### 7. PERMIT NUMBER:

### 8. USE:

- ☐ Residential ☐ Public Supply ☐ Process  
☐ Irrigation ☐ Air Conditioning ☐ Emergency  
☐ Test Well ☒ Monitor Well ☐ Replacement

### 9. WELL DEPTH (completed)

Date Started: 11/03/04

15.0 ft.

Date Completed: 11/03/04

### 10. CASING: ☒ Threaded ☐ Welded

Diam.: 2"

Type: ☒ PVC ☐ Galvanized

☐ Steel ☐ Other

0.00 in. to 5.0 ft. depth

in. to ft. depth

Height: Above ☐ Below ☐

Surface ☒ n/a ft.

Weight lb./ft.

Drive Shoe? ☐ Yes ☒ No

### 11. SCREEN:

Type: PVC

Diam.: 2"

Slot/Gauge: .010 Length: 10.0

Set Between: 5.0 ft. and 10.0 ft.

NOTE: MULTIPLE SCREENS  
USE SECOND SHEET

ft. and ft.

Sieve Analysis ☐ Yes (please enclose) ☐ No

### 12. STATIC WATER LEVEL n/a ft. below land surface after 24 hours

### 13. PUMPING LEVEL Below Land Surface.

n/a ft. after hrs. Pumping G.P.M.

Pumping Test: ☐ Yes (please enclose) ☒ No

Yield:

### 14. WATER QUALITY

Chemical Analysis ☒ Yes ☐ No Bacterial Analysis ☐ Yes ☒ No

Please enclose lab results.

### 15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No

Installed from 15.0 ft. to 2.0 ft.

Effective size Uniformity Coefficient

### 16. WELL GROUTED? ☒ Yes ☐ No

☐ Neat Cement ☐ Bentonite ☒ Bentonite/Cement ☐ Other

Depth: From 2.0 ft. to 0.00 ft.

### 17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: n/a ft. direction

Type

Well Disinfected ☐ Yes ☒ No Type: Amount:

### 18. PUMP: Date installed: Not installed ☒

Mfr. Name: Model No.:

H.P. Volts Length of drop pipe ft. Capacity gpm

TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine

☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

### 19. WELL DRILLER: Diversified Drilling Service CERT. NO.: 1142

Address: (Print)


Level: A B C D (circle one)

620 Palmetto st. MT.Pleasant, SC 29464

Telephone No.: (843) 601-2011

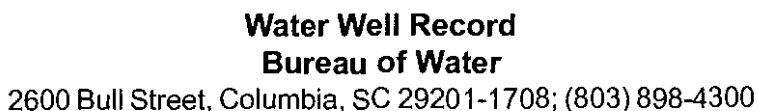
Fax No.: (843) 884-4604

### 20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed:   
Well Driller

Date: 2/27/09

If D Level Driller, provide supervising driller's name:



DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)



## Water Well Record Bureau of Water

2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

### 1. WELL OWNER INFORMATION:

Name: N.A.V.F.A.C. southern div.  
(last) (first)  
Address: 2155 Eagle dr. 29419-9010  
City: North Charleston State: SC Zip:  
Telephone: Work: (843) 820-7307 Home:

### 2. LOCATION OF WELL: GW-003 COUNTY: Chas.

Name: Charleston Navel Complex Bldg.236  
Street Address:  
City: North Charleston Zip: 29419-9010  
Latitude: 32 56 588" Longitude: 79 60 430"

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:  
Bldg. 236 enc236gw003

4. ABANDONMENT: ☒ Yes ☐ No

Grouted Depth: from 15.0 ft. to 0.00 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
-----------------------	-----------------------	----------------------------

\*NOTE CNC236GW003

ABANDONED ON 2/24/09

BENTONITE TREMIE

METHOD.

\*Indicate Water Bearing Zones

(Use a 2nd sheet if needed)

### 5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored  
☐ Dug ☐ Air Rotary ☐ Driven  
☐ Cable tool ☐ Other

### 7. PERMIT NUMBER:

### 8. USE:

☐ Residential ☐ Public Supply ☐ Process  
☐ Irrigation ☐ Air Conditioning ☐ Emergency  
☐ Test Well ☒ Monitor Well ☐ Replacement

### 9. WELL DEPTH (completed)

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15.0 ft.

Date Completed: 11/03/04

### 10. CASING: ☒ Threaded ☐ Welded

Diam.: 2"

Type: ☒ PVC ☐ Galvanized  
☐ Steel ☐ Other

0.00 in. to 5.0 ft. depth  
in. to ft. depth

Height: Above ☐ Below ☐

Surface n/a ft.

Weight lb./ft.

Drive Shoe? ☐ Yes ☒ No

### 11. SCREEN:

Type: PVC

Diam.: 2"

Slot/Gauge: .010 Length: 10.0

Set Between: 5.0 ft. and 15.0 ft.

NOTE: MULTIPLE SCREENS  
USE SECOND SHEET

ft. and ft.

Sieve Analysis ☐ Yes (please enclose) ☐ No

### 12. STATIC WATER LEVEL n/a ft. below land surface after 24 hours

### 13. PUMPING LEVEL Below Land Surface.

n/a ft. after hrs. Pumping G.P.M.

Pumping Test: ☐ Yes (please enclose) ☒ No

Yield:

### 14. WATER QUALITY

Chemical Analysis ☒ Yes ☐ No Bacterial Analysis ☐ Yes ☒ No

Please enclose lab results.

### 15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No

Installed from 15.0 ft. to 2.0 ft.

Effective size Uniformity Coefficient

### 16. WELL GROUTED? ☒ Yes ☐ No

☐ Neat Cement ☐ Bentonite ☒ Bentonite/Cement ☐ Other

Depth: From 2.0 ft. to 0.00 ft.

### 17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: n/a ft. direction

Type

Well Disinfected ☐ Yes ☐ No Type: Amount:

### 18. PUMP: Date installed: Not installed ☒

Mfr. Name: Model No.:

H.P. Volts Length of drop pipe ft. Capacity gpm

TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine  
☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

### 19. WELL DRILLER: Diversified Drilling Service CERT. NO.: 1142

Address: (Print)

Level: A B C D (circle one)

620 Palmetto st. MT.Pleasant, SC 29464

Telephone No.: (843) 884-4604

Fax No.: (843) 884-4604

### 20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed:   
Well Driller

Date: 2/27/09

If D Level Driller, provide supervising driller's name:

## **APPENDIX C**



Photograph 1: View of the initial removal of cement pad at monitoring well 236MW002.



Photograph 2: View of the dry-dock area located immediately north of the site.





Photograph 3: View of 236MW002 after removal of the concrete pad.



Photograph 4: View of 236MW002 after grouting. The bags near the wall contain the materials used for the asphalt patch.





Photograph 5: View of 236MW001 prior to abandonment.



Photograph 6: View of 236MW003 prior to abandonment.





Photograph 7: View of storage area that 236MW003 is located within.



Photograph 8: View of 236MW002 after the asphalt patch was installed.



Photograph 9: View of 236MW003 after asphalt patch was installed.